

## ABSTRACT

The present invention comprises a novel method to expand sulfur processing capacity for a new or existing sulfur recovery unit. Selective oxidation catalyst is used instead of Claus reaction catalyst, the expanded capacity being potentially equal to medium to high level oxygen enrichment processes wherein major equipment types, sizes and costs are substantially the same as that of a conventional modified Claus process unit using air in the thermal stage. Thus, the invention process comprises methods for retrofits of existing sulfur recovery units having been designed for processes not including direct oxidation in a catalyst bed between a thermal or first oxidation stage (as is typical of lean acid gas plants) and the tail gas treatment stage. Tail gas treatment stages typically act on process streams having preferably less than about 5 mole percent of non-elemental sulfur components in the process stream, but more preferably when that level drops to about 1 mole percent of non-elemental sulfur components in the process stream. The prior art fails to suggest that such mid-positions for direct oxidation catalyst beds in a sulfur recovery unit, i.e. those positions after a first stage (thermal or oxidation) and a final stage (5 to 1 or less mole percent of non-elemental sulfur components in the process stream).